HIBBS (R.A.)

COMPLIMENTS OF THE AUTHOR. INDEX MEDICUS

THE RELATION OF SUPPURATION TO SHORTENING OF THE LIMBS IN TUBERCULOUS DISEASES OF THE HIP JOINT.

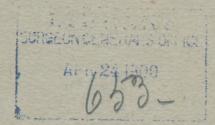
A Study of One Hundred and Six Cases.

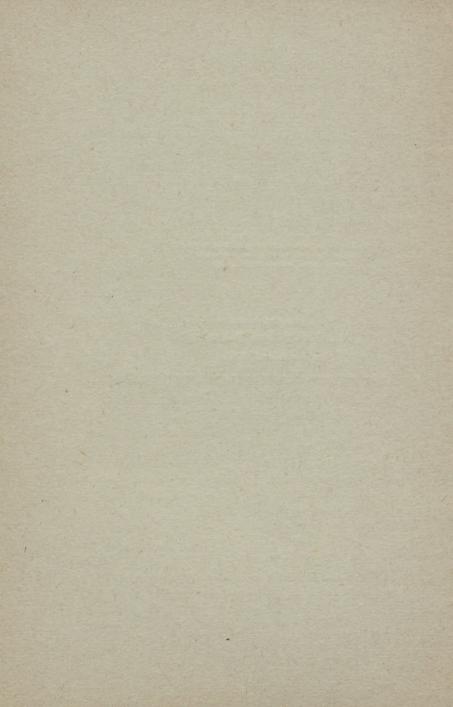
BY

RUSSELL A. HIBBS, M. D.,

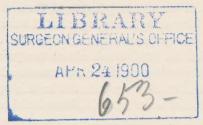
House Surgeon to the New York Orthorædic Dispensary and Hospital; Late Assistant to the Chair of Orthorædic Surgery in the University Medical College.

REPRINTED FROM THE
New York Pardical Journal
for November 5, 1898.





Reprinted from the New York Medical Journal for November 5, 1898.



THE RELATION OF SUPPURATION TO SHORTENING OF THE LIMBS IN TUBERCULOUS DISEASES OF THE HIP JOINT.

A STUDY OF ONE HUNDRED AND SIX CASES.

BY RUSSELL A. HIBBS, M. D.,

HOUSE SURGEON TO THE NEW YORK ORTHOPÆDIC DISPENSARY AND HOSPITAL; LATE ASSISTANT TO THE CHAIR OF ORTHOPÆDIC SURGERY IN THE UNIVERSITY MEDICAL COLLEGE.

SUPPURATION in connection with tuberculous disease of the hip joint and the relation it bears to the shortening of the limb can only be determined by a study of cases of both varieties of the disease existing under similar conditions and being treated by the same methods.

The tabulated report of the following number of cases, one hundred and six in all—forty-seven of the non-suppurative variety, Table I, and fifty-nine of the suppurative variety, Table II—is made with the object in view of determining this question.

The writer realizes that conclusions based upon a clinical study of so small a number of cases can not be considered final, but hopes that such study, and the conclusions drawn therefrom, may be of some value in the final determination of this question.

COPYRIGHT, 1898, BY D. APPLETON AND COMPANY.

These cases were patients of the New York Orthopædic Dispensary and Hospital at the time the measurements and notes were taken; and all of the cases there in which the disease had existed two years and upward which the writer could see and measure during a period of several months are included in this report, with the exception of cases in which bone had been removed by some operative procedure, and two or three in which the deformity was so great that correct measurements could not be taken. The measurement of the limb was taken from the anterior-superior spine of the ilium to the internal malleolus.

The mechanical treatment as effective in the production of the conditions found to exist is represented in most instances by the length of time they were under the care of the above-named institution, and was by the traction method, as applied by the long traction hip splint. In only twenty-six cases had there been any previous mechanical treatment; and in these, so far as it could be determined, it was of little consequence, except in one instance, Case XXXI, Table I, which was treated in St. Luke's Hospital for two years previously, and, as the method used was the same as in the others, this is not considered as previous treatment.

The greater number received only the care of dispensary patients, only a small percentage having had any hospital treatment. The abscesses in those cases of the suppurative class, when the abscess developed while under the care of the dispensary and hospital, were treated, in most instances, by the non-interference plan, being allowed to open spontaneously, when opening occurred, and to continue uninterfered with through their entire course. That abscess may develop at some fu-

ture time in the course of the disease in those cases classed as non-suppurative is to be expected. Still, this does not lessen their value in the determination of the question in hand, as abscess could not have been a determining factor in the amount of shortening found to exist at the time the observations were made. The arrangement of the cases in Tables I and II is such as to afford the reader, in brief, a complete history of each case, while Tables III and IV, based respectively on Tables I and II, deal with the cases only from the standpoint of the duration of the disease, the amount of shortening, and the duration of treatment.

There was no shortening in three cases, or 6.38 per cent., of the non-suppurative class, and in six cases, or 10.16, of the suppurative. Two of the latter number had, respectively, five eighths and three fourths of an inch lengthening. Three, or 6.38 per cent., of the nonsuppurative, and fourteen, or 23.72 per cent., of the suppurative class had less than half an inch; fifteen, or 31.91 per cent., of the non-suppurative, and fourteen, or 23.72 per cent., of the suppurative, from half an inch to an inch. Eight, or 17.02 per cent., of the non-suppurative, and fourteen, or 23.72 per cent., of the suppurative, had from an inch to an inch and a half. Eight, or 17.02 per cent., of the non-suppurative, and five, or 8.47 per cent., of the suppurative had from an inch and a half to two inches; five, or 10.62 per cent., of the non-suppurative, and three, or 5.08 per cent., of the suppurative, from two to two inches and half; four, or 8.51 per cent., of the non-suppurative, and one, or 1.69 per cent., of the suppurative, from two inches and a half to three inches; and one, or 2.13 per cent., of the non-suppurative, and two, or 3.38 per cent., of the suppurative, from three to

four inches. Exclusive of the number that have no shortening, seventy-one per cent. of the suppurative class and only fifty-five per cent. of the non-suppurative class have less than an inch a half shortening.

Thus it is seen that whatever effect the process of suppuration may have had upon other conditions found to exist in these patients, it has not been that of causing shortening of the limb, as those cases which have never had suppuration in the course of the disease in the majority of instances have a greater amount of shortening.

The course of tuberculous disease of the hip joint is so much an individual matter that general statements in regard to any feature of such cases are liable to be more or less inaccurate. However, it seems reasonable to credit with considerable accuracy conclusions based upon a study of cases similar as regards the most important conditions affecting them. This similarity will be found to exist in a general way as applied to the whole number of cases, while a study of individual cases comparatively, both as regards the duration of the disease, treatment, and the efficiency of the treatment as carried out in detail, will emphasize this fact and sustain the conclusion that the amount of shortening is greater in the non-suppurative cases than in the suppurative.

The effect that suppuration produced upon the shortening of the limb in these patients, if any, would seem to represent very nearly its true effect, as the suppuration has been allowed to pursue its own course as the natural expression of a morbid process uninterfered with by operative procedure, affected only by the means applied for the relief of the disease, which was the same in both the suppurative and the non-suppurative cases. The moment that operative measures are instituted for the relief of abscess in connection with such disease the suppuration ceases to be the simple non-septic process that it is, as a rule, when undisturbed by operation, and becomes complicated, so that it no longer truly represents such suppuration, and it naturally follows that conclusions based upon a study of suppuration existing under such circumstances in regard to its causative relation to shortening of the limb must necessarily be incorrect.

The development of abscess in the course of such disease, being evidence of the destruction of tissue, would seem to justify the opinion held by most writers that the greater amount of shortening is to be expected in such cases than in cases which have no suppuration; particularly when it is believed, as it is by many, that the principal cause of shortening is the destruction of tissue. To the extent that shortening is caused by destructive changes in the joint, to the same extent is it indicative of the destruction of bone, as the destruction of other tissues would only to a very slight degree, if at all, affect the length of the limb. In view of the conditions found to exist in these patients, suppuration does not seem to have been evidence of as great destruction of bone as occurred in cases which had no suppuration, and suggests that suppuration is evidence that the disease was chiefly confined to the soft structures in and around the joint, and, their nature being such as to afford less resistance to the morbid process, they were more rapidly destroyed—thus the formation of abscess: while in the cases where suppuration did not exist (caries sicca), the disease was chiefly confined to the

Table III.—Non suppurative Cases.

DURA-											
DIS- EASE.	Cases.	None.	Less than ½ in.	1/2-1	1-11	11-2	2-21	£ -3	3-4	Average dur- tion of treat ment.	f treat-
Years.											
2-3	5	1	1	3						212	years.
3-4	7	1		3	3					22	66
4-5	7	1	2	1	2	1				23	46
5-6	8			4		3	1			32	- 44
6-7	5			2	1	1	1			5	66
7-8	3				2	1				51	6.6
8-9	2			1			1			7	66
9-10	4						2	1	1	772	44
10-11	î							î		10	66
11-12	3			1		1		1		105	46
12-13	1					1				4	44
13 and	1					1				7	
upw'rd	1									144	66

bone, and more active in its destruction and in interfering with its growth, as evidenced by the greater amount of shortening.

That in most instances such disease begins as an osteitis is not opposed to this suggestion, as the structure

Table IV.—Suppurative Cases.

DURA-										
DIS- EASE.	Cases.	None.	Less than in.	1-1	1-11	11-2	2-21	21-3	3-4	Average dura- tion of treat- ment.
Years.										
2-3	10	3	4	1	2					14 year.
3-4	11	1	5	5						$2\frac{5}{6}$ years.
4-5	9	1	2	2	2	2				31 "
5-6	7	1	1	1	3		1			3 5 16
6-7	2		1	1						41 "
7-8	5		1	2	2					52 "
8-9	3				3					32 "
9-10	4			2	1		1			51 "
11-12	4 3				2				1	10 "
13 and									-	
upw'rd	5				2			1	1	115 "

in which it has its origin does necessarily determine the nature of the structures to which it may extend and be most destructive of in its progress. If the development of the abscess in the course of the disease is evidence chiefly of the destruction of soft structures, the fact that abscess appears in the majority of cases would indicate that, though beginning as an osteitis, other structures are soon involved. The surrounding structures, having less power of resistance than bone, certainly furnish a more susceptible field for the spread of the disease; particularly so in cases where the effect of traumatism in lessening the power of resistance of bone and increasing the activity of the disease is minimized to the greatest degree by efficient mechanical protection. What explanation can be offered that more fully justifies the conditions found to exist in many of these patients—those in which the suppuration was profuse and had existed for long periods of time, but that had little shortening, none at all, or even lengthening? Note Case XXXVI, Table II—the suppuration was profuse at the time of this observation, and had continued for four years and a half, and there was only a fourth of an inch shortening; and Cases III and IX, which had, respectively, five eighths and three fourths of an inch lengthening; the abscesses had discharged for sixteen months in the former and ten in the latter, and were still open in both at the time the notes were made. Certainly in such cases suppuration could not be regarded as evidence of the destruction of bone or as profoundly interfering with its growth, else there would have been a greater amount of shortening. In a few cases, where suppuration had existed for a long period of time, there was considerable shortening, but such cases, as a rule, are those in which the treatment was very inefficient, and in consequence of the poor protection of the joint the effect of traumatism was greater in increasing the activity of the disease and the destruction of bone. There is not necessarily, even in these cases, any relation existing between the suppuration and the shortening, and it is probable that if the protection of their joints had been good the shortening of the limb would have been less.

The important consideration in any case, as in these, is the effect of traumatism upon the bone, which not only diminishes its disease-resisting power, but to the point of its being less than that of the surrounding structures, thus increasing the amount of bone destroved and measuring the amount of shortening dependent upon this cause. One can understand that in some cases suppuration may depend to some degree upon the destruction of bone, but that, as a rule, it can not be considered indicative of the extent of such destruction is certainly true of these cases, and a striking illustration of this is seen in such disease of the spineas in that region of the spine, the upper dorsal, where there is the greatest destruction of bone, as evidenced by the greatest amount of deformity, abscess is comparatively infrequent; while in the lower dorsal and lumbar region abscess is frequent and suppuration often profuse. the destruction of bone is small and the deformity slight; the greater destruction of bone in the one case. the upper dorsal, depending upon the effect of constant traumatism, which can not be relieved, while in the other, lower dorsal and lumbar, the relief of traumatism is less difficult and more complete and the destruction of bone less.

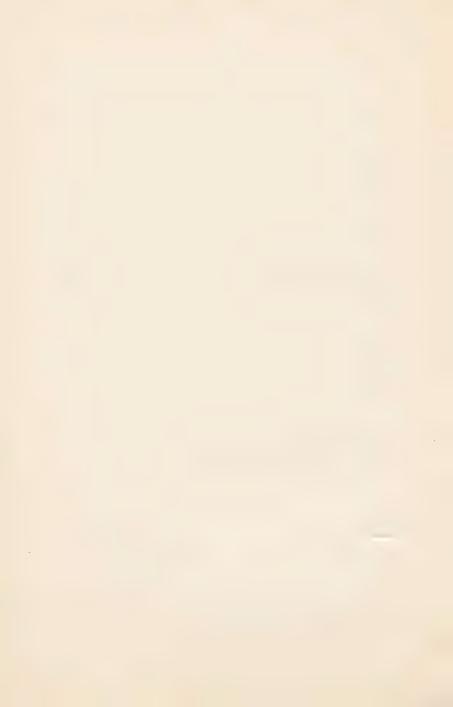
						TABLE	I.—Non-	suppurative Cases.		
Case No.	Sex.	Age.	Hip dis- eased.	Duration of disease.	Short'ning of limb.	Duration of treatment.	Length of time in hospital.	Atterdance at dispensary.	Previous treatment.	Notes.
1 2 3 4	F. M. M. F.	Years. 28 9 9 20	Right. Left. Right. Left.	Years. 4 6 4½ 5	Inches.	Years. 1 5 $1\frac{1}{2}$ $3\frac{1}{2}$	Years.	Regular but infrequent. Regular and frequent Regular. Regular!	Different methods. No mechanical. Different methods. No mechanical.	First attack, three years; second attack, two years.
5 6 7 8 9 10 11 12	M. F. M. F. M. F.	12 16 5 10 14 14 13 8	Left. Left. Right. Right. Left. Left. Left.	$ \begin{array}{c} 6 \\ 11\frac{1}{2} \\ 3\frac{1}{2} \\ 2\frac{1}{2} \\ 11 \\ 9 \\ 11\frac{1}{2} \\ 4\frac{1}{2} \\ 2 \end{array} $	1 1 1 1 None. 2 1 3 3 8 4 4	3 111 31 2 104 81 101 46	3 2 ¹	Regular. Regular. Regular but infrequent. Regular but infrequent. Regular. Regular and frequent.		,
13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	M. M. F. F. M. M. M. M. M. M. F. F. F. F. F. M. M. M. M. M. M. M. F. F. F. M. M. M. M. M. M. F. F. F. M.	15 11 12 13 10 11 5 17 6 14 3 10 14 15 9 10 23 7	Left. Left. Right. Right. Right. Right. Left. Left. Right. Left. Right. Left. Left. Right. Left.	7½ 6 3 15 3 12 2½ 9 10% 5 5 5 3¼	# 55 1 1 1 5 4 5 7 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8	$\begin{array}{c} 2\\ 5\frac{1}{5}\\ 7\\ 4\\ 5\frac{1}{2}\\ 6\\ 2\frac{3}{4}\\ 14\frac{1}{2}\\ 3\\ 4\\ 1\frac{5}{8}\\ 9\\ 10\\ 2\\ 3\\ 2\\ 1\frac{1}{5}\\ 3\\ 3\\ 3\\ 3\\ 3\\ 3\\ 3\\ 3\\ 3\\ 3\\ 3\\ 3\\ 3\\$	3 	Regular. Regular and frequent. Irregular attendance. Irregular, Regular and frequent. Regular and frequent. Regular. Regular. Regular and frequent. Regular and frequent. Regular and frequent. Regular and frequent. Regular. Irregular. Regular. Regular. Regular. Regular.	No mechanical.	In St. Luke's Hospital two
32 33 34 35 36 37	F. F. F. M. M.	$ \begin{array}{ c c c c } \hline 5\frac{1}{2} \\ 15 \\ 12 \\ 8 \\ 6 \\ 5 \end{array} $	Left. Left. Left. Left. Left. Left.	384 918 8 284 312 4	234 234 2 1	3 9 ¹ / ₃ 8 2 ⁸ / ₄ 3		Regular and frequent. Regular. Irregular. Regular. Regular. Regular.	No mechanical. No mechanical. Wire cuirass for one year,	years of this time.
38 39 40 41 42 43 44 45 46 47	F. F. M. M. M. M. F. F. F.	16 10 8 8	Left. Left. Right Right Left. Right Left. Left. Right	2 8 4 53 6 5 4	288 None. 1284 1112 122 112118	3 ½ 2 2 6 3 4 4 4 5 5 ½ 5 ½ 5 ½	116 238	. Regular, . Irregular, . Irregular, . Irregular, . Regular, . Regular,	one year. No mechanical, No mechanical. Weight and pulley Different methods No mechanical, Different methods	

46 47	F			eft. ght.	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 4 \\ 5\frac{1}{2} \end{array}$		Regular.		840-				
						Тав	le II.—	-Suppurat	tive C	ases.				
No.		Age.	Hip diseased.	Duration of disease.	Location of abscess.		Duration	Length of time abscess		Dura- tion of treat- ment.	gth of me in ospital.	Attend- ance t dispen-	Previous treatment.	Notes.
· Case No.	Sex.		eased.				sorption.	discharged.				sary.		
1	M.	Yrs. 10	Right.	Yrs. 8	Outer aspect of thigh.	Very large.		8 months.	Inches.	2	2		Different methods.	
2	M.	7	Right.	21/2	Antero-lateral aspect of thigh. Anterior aspect of	Large. Very		1 year.	None.	1 2	1 2	1	No me- chanical No me-	§ inch lengthening.
3	M. F.	15	Left.	$\begin{vmatrix} 4 \\ 2\frac{1}{2} \end{vmatrix}$	thigh. Femoral region.	large.	1 year.		1	21/2	21		chanical.	
5	F.	6	Left.	5	Gluteal region. Outer aspect of	Large.	21 mos.	11 months.	1 1 8	4 21	$3\frac{1}{2}$ $2\frac{1}{2}$	Regular.	Different methods. No me-	
6	F.	6	Right.	3½ 8	thigh. Outer aspect of	Large.		$1\frac{1}{2}$ year.	1 ‡	3	3		chanical. Different	
8	F.	9	Right.	3	thigh. Femoral region.	Medium.	$1\frac{1}{2}$ year.		4	2	2		Mo me- chanical.	
9	М.	10	Right.	$5\frac{1}{2}$	Outer aspect of thigh.	Very large.		10 months (continues).	None.	41/2	$4\frac{1}{2}$	Dlan	No me- chanical.	3 inch lengthening.
10	F.	13	Right.	9 7 <u>8</u>	Outer aspect of thigh. Outer aspect of	Large.		1 year. 5 months.	34	6 7 <u>8</u>		Regular.	No me- chanical.	Cured. Has gone without brace three years.
12	F.	15	Left.	13	thigh. Outer aspect of	Unknown.		Few months.	11/8	111		Irregular.	No me-	
13	F.	14	Right.	6	thigh. Gluteal and femoral regions.	Large.		$2\frac{1}{2}$ years.	$\frac{1}{2}$	5		Regular and fre-	No me- chanical.	
14	F.	17	Right.	11	Outer aspect of thigh.	Unknown		Unknown.	11/8	10		quent. Irregular and infre-	No me-	
15	M.	21	Left.	131	Outer aspect of	Unknown.		Unknown.	18	122		quent. Irregular	No me-	Treatment interrupted
16	F.	14	Left.	7%	thigh. Anterior aspect of	Medium.	!	3 years.	1 8	5%		and infrequent. Irregular.	chanical. Different	for three years.
17	F.	9	Left.	3 1/2	thigh. Antero-lateral as-	Medium.			1 1	3		Regular and fre-	methods. No me-	Abscess has existed
18	F.	14	Right.	91	pect of thigh. Onter aspect of	Large.		3 years.	18	5 <u>‡</u>		quent. Irregular.	chanical. Weight	three months. Increasing.
		1			thigh.				İ		4		ley for a few mos.	
19	F.	18	Left.	111/2	Two: femoral and external aspect	Medium.		9½ yrs. and continues.	4	101		Irregular and infre-	No me-	Treatment frequently interrupted.
20	F.	13	Left.	$11\frac{1}{2}$	of thigh. Outer aspect of thigh.	Large.	1 year.		14	91		quent. Regular.	No me-	
21	Μ.	6	Right.	45	Outer aspect of thigh.	Large.		2 years (continues).	18	4		Regular and frequent.	No me- chanical.	
22	F.	6	Left.	21/2	Outer aspect of thigh.	Large.	20 mos.		1			Regular.	No me- chanical.	
23	М.	5	Left.	31/3	Outer aspect of thigh.	Small.	10 mos.		1/4	21/3		Regular and frequent.	No me- chanical.	
24	F.	18	Left.	14	Outer aspect of thigh.	Large.		9 months.	2	14		Regular but infre-		Treatment interrupted for three years.
25	М.	8	Left.	34	Outer aspect of thigh.	Large.		$1\frac{1}{2}$ year (continues).	5 8	33		quent. Regular but infre-		Treatment interrupted for fifteen months.
26	F.	15	Right.	4	Antero outer aspect of thigh,	Very large,		1½ year.	184	38	$2\frac{1}{2}$	quent. Regular and fre-	No me-	
27	F.	8	Right.	7	Gluteal region.	Large.	ļ		118	1	2 8	quent. Regular	Weight	
			!					(continues).				but infrequent.	ley for 3 months.	
28	M.	1()	Left.	5 1/2	Femoral region.	Large.		21 months.	1 }	4	3	Regular but infrequent.	No me- chanical.	
29	F.	6	Left.	2	Inguinal region.	Small.		6 months.	1/4	13	• • • • •	Regular and frequent.	No me- chanical.	
30	F.	6 1/2	Right.	$2\frac{1}{2}$	Outer aspect of thigh.	Large.		7 months.	84	2		Regular and fre-	Weight and pul-	
31	¹ M.	6	Right.	3	Outer aspect of thigh.	Large.		2 years.	18	3		quent. Regular and fre-	ley.	
32	M.	21	Right.	15	Anterior aspect of thigh.	Large.		Unknown.	3 ½	11		quent. Irregular and infre-	No me-	
33	M.	13	Right.	7 ½	Antero-lateral as-	Large.		6 years	34	61		quent. Very reg-	No me-	
34	M.	5	Right	3	pect of thigh. Outer aspect of	Large.		(continues).	84	3		ular and frequent. Regular		
35	F.	5	Right.	31/2	thigh. Outer aspect of	Large.		(continues). Not known.		11		and frequent. Irregular.	No me-	
36	М.		Right.	74	thigh. Antero-outer as-	Very		4½ years	1 4	7壹		Regular.	chanical. No me-	Five open sinuses at
37	F.	6	Left.	6	pect of thigh. Gluteal region.	large. Small.		(continues).	1/8	4		Regular.	chanical.	this writing. Abscess quiescent.
38	M.	4	Right.	2	Outer aspect of thigh.	Very large.			None.	1		Regular and frequent.	Different methods.	Abscess increasing.
39	М	12	Right.		Antero-lateral aspect of thigh.	Large.			1			Irregular.	Unknown	
40	F.	8	Left.	4.3	Anterior aspect of thigh.	Large.		$2\frac{1}{3}$ years.	15	4.1		Regular and frequent.	No me- chanical.	
41	F.	12	Right.	22	Outer aspect of thigh.			1	None.			Regular.	Different methods.	Abscess disappearing.
42	M. F.	8	Left.	33	Outer aspect of thigh, Outer aspect of	Very large. Very	1 year.	1½ year.	None.			Regular		
44	M.	9	Right.	4 4 4	thigh. Outer aspect of	large.		19 months.	3.4			and frequent. Regular.	Plaster-	
				1	thigh. Outer aspect of							Regular	of-Paris spica. Different	
45	М.	10	Left.	913	thigh.				58	33	1 }	and frequent.	methods.	
46	M. M.	7	Left.	5½ 2¾	Outer aspect of thigh. Outer aspect of			3 months. 6 months.	1 k	$2\frac{1}{2}$	21/2	Regular.	Weight & pulley.	
48	M.	10	Right.	4	thigh. Outer aspect of				1	4		Regular	chanical.	
49	F.	7	Left.	51	Antero-outer as-	Large.	15 mos.		1	4	1/2	but infrequent. Regular	No me-	
50	М.	24	Right.	19	pect of thigh. Outer aspect of	Small.		4 months.	2-7	10		and frequent. Irregular.	chanical. Plaster-	
					thigh. Anterior aspect of				21			Irrégular	of Paris	
51	F.	9	Left.	5%	thigh.							and infrequent.	methods.	
52 53	M. M.	14 10	Right.	4	Outer aspect of thigh. Antero-outer as-	Unknown. Very		3½ years	1½ 3	2½ 3¾	2½	Irregular.	Different methods. No me-	
54	F.	16	Left.	9	pect of thigh. Outer aspect of	large.		(continues) 8 years.	2	6		Irregular and infre-	chanical. No me-	
55	F.	8	Left.	$2\frac{1}{2}$	thigh. Anterior aspect of	Large.	14 mos.		None.	1 <u>5</u>	15.	quent.	Different	
56	М.	7	Left.	34	thigh. Outer aspect of thigh.	5	A few months,		$\frac{1}{2}$	34		Regular and fre-	methods.	
57	М.	11	Left.	5	Outer aspect of	ÿ	months.	At intervals	11/8	1	1	quent.	Different	
58	F.	9	Right.	4	thigh. Outer aspect of	Large.		during four years. 6 months.	1/4	$2\frac{1}{2}$	1	Regular	methods.	
59	М.	3	Left.	$2\frac{1}{2}$	thigh. Outer aspect of	Large.	6 mos.		None.	2		but infrequent. Regular.	chanical. No me-	
00	-			Z	thigh.	0							chanical.	



In addition to the amount of shortening caused by destructive changes in the joint, there is undoubtedly a trophic disturbance operating as an effective cause of shortening, not only by seriously retarding the growth of the bone, but by producing its atrophy. Evidence of this is seen in the early appearance of atrophy of the muscles before disuse has occurred and in the shortening of the tibia. An analogous condition of the bones is seen in infantile paralysis. There does not seem to be any reason to believe that suppuration has any effect in increasing the amount of shortening produced by this cause, particularly if it is left uninterfered with as the simple expression of the disease, but that the amount of shortening due to trophic disturbances depends upon the extent of the involvement of bone, as does that produced by destructive changes in the joint and, as suppuration is no index to the amount of bone diseased and destroyed, it bears no relation to shortening of the limb. So there is no reason to expect greater shortening in cases which have suppuration than in those which have not.

126 EAST FIFTY-NINTH STREET.







APPLETONS' POPULAR SCIENCE MONTHLY.

The Best Magazine for Thinking People.

